86093JLT
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Karissa L. Eckert, et al

STABILIZED HIGH-SPEED THERMALLY DEVELOPABLE EMULSIONS AND PHOTOTHERMOGRAPHIC MATERIALS

Serial No. 10/715,199

Filed 17 November 2003

Group Art Unit: 1752

Examiner: Schilling, Richard L.

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Sherryl A. Payne

5/6/2005
Date

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. 1.131

We, Karissa L. Eckert, James B. Philip, Kumars Sakizadeh, and Doreen C. Lynch, hereby say and declare that:

(1) We are the co-inventors of the invention described and claimed in the patent application identified above.

(2) We have been for at least the last 3 years employed by Eastman Kodak Company in its facilities located in Oakdale, Minnesota.

(3) During at least the last 3 years, as employees of Eastman Kodak Company, we have been involved in research and development work relating to imaging science and relating particularly to photothermographic compositions and materials and components thereof, and methods of imaging these materials to provide visible images.

(4) The presently claimed invention was conceived and reduced to practice in the United States of America prior to June 11, 2002, the priority date of U.S. Patent 6,576,410 (Zou et al.) that has been cited as prior art in the recent Office Action received from the USPTO.

(5) Prior to June 11, 2002, we conceived of and reduced to practice:

(I) a photothermographic composition for providing a black-and-white image, the composition comprising a binder, and in reactive association, a photosensitive silver halide, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, an ascorbic acid or reductone reducing agent for the non-photosensitive source of reducible silver ions, and

the composition further comprising a polycarboxylic acid that has a pKa of less than 4.5,

(II) a black-and-white photothermographic material comprising a support and having on at least one side thereon one or more thermally developable imaging layers comprising a binder, and in reactive association, a photosensitive silver halide, a non-photosensitive source of reducible silver ions that includes a silver salt of a compound containing an imino group, an ascorbic acid or reductone reducing agent for the non-photosensitive reducible silver ions, and optionally an outermost protective layer disposed over the one or more thermally developable imaging layers, and

wherein the outermost surface of the one or more thermally developable imaging layers, or the outermost surface of the protective layer if present, has a surface pH of less than 7, and the one or more thermally developable imaging layers further comprise a polycarboxylic acid that has a pKa of less than 4.5, and

(III) a method of forming a visible image comprising:

A) imagewise exposing the photothermographic material of the present invention to form a latent image,

B) simultaneously or sequentially, heating the exposed photothermographic material to develop the latent image into a visible image.

(6) Exhibit A is a true electrophotographic copy of notebook pages 192-194 in notebook BB9772 assigned to Karissa L. Eckert that are dated prior to June 11, 2002 and that describe a photothermographic composition and material and imaging method as claimed in the present application, except that irrelevant information has been obscured.

(7) In particular, notebook pages 192-194 of Exhibit A describe a photothermographic composition as having a binder identified as "Gel 30" on page 192, a photosensitive silver halide identified as "3076Bfy1 AgX" on page 192, a non-photosensitive source of reducible silver ions that includes a silver salt of benzotriazole identified as "AgBZT80" on page 192, ascorbic acid reducing agent identified as "AA" in Toner/Developer solution #1 on page 192, and citric acid, a polycarboxylic acid having a pKa less than 4.5, identified in solution #1 as "citric acid" on page 192.

In addition, page 192 identifies a support as "blue base" on which the photothermographic composition was coated to form a photothermographic material.

Page 192 describes the processing temperature of 150°C and page 193 describes processing conditions [15" (sec) and 150°C temperature] after exposure (in seconds) to radiation ("10^{-2} exposure") in an imaging method to provide visible images in the photothermographic material and accompanying sensitometric results in the resulting images.

These features have been highlighted in yellow on pages 192-193 for the Examiner's convenience.

(8) Thus, Exhibit A demonstrates that conception and reduction to practice of the presently claimed invention were made prior to June 11, 2002.

(9) All statements made herein of our own knowledge are true and all statements made on information and belief are believed to be true, and that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

4-27-2005
Date

Karissa L. Eckert

4-27-2005
Date

James B. Philip

4/28/2005
Date

Kumars Sakizadeh

4/27/05
Date

Doreen C. Lynch

Notebook No. BB9772

RESEARCH / DEVELOPMENT

EASTMAN KODAK COMPANY

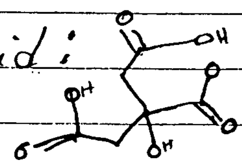
Date

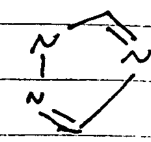
Problem: Thermal Solvents in Ag + in Ag/TC coatings

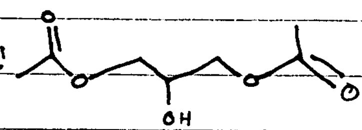
Experiment KE061402:

In this experiment three new thermal solvents were looked at: citric acid, 1,2,4-triazole, + diacetin. Adding 1,3-DEU to a coating w. a gel topcoat was also looked at. The 1,3-DEU was added the silver, the silver + the topcoat, + the silver + the topcoat using a higher level of 1,3-DEU in the topcoat.

~~Make Sh~~ KLE

citric acid:  mp: 153°C bp: decomposes

1,2,4-triazole:  mp: 119°C bp: 260°C

diacetin:  mp: -30°C bp: 280°C

Make Sheet Below:

KE061402		Aquaous High-Speed Formulation								
if dmin 0.35-0.37 then spd2 is 4.9-5.1			0	1	2	3	4	5	6	7
			Control	control w citric acid	control w 1,2,4-triazole	control w diacetin	control w gel TC, T/D in TC	Control w gel TC, T/D in TC, 1,3-DEU in Ag	control w gel TC, T/D in TC, 1,3-DEU in Ag and TC	Control w gel TC, T/D in TC, 1,3 DEU in Ag, 1.5x 1,3-DEU in TC
Chemical	Concentration									
			Batch A (12x)							
AgBZT80	1706.5 g/mol	9.50 g	114.0 g							
EG Gel 30 (10.5g gel/19.5 g H2O)	35%	0.86 g	10.32 g							
15min/melt@50C										
MBTI (0.3 g MBTI, 5.7 g water)	5%	0.48 g	5.76 g							
10min/melt@50C										
NaBZT	0.7M	0.34 g	4.08 g							
Hold 90min @40C			adjust to 5.5 pH 30 mintues into 90 min hold time							
Aliquot			11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A	11.18 g / A
3075BFy1 AgX (melt@40C)	837 g/mol		0.98 g	0.98 g	0.98 g	0.98 g	0.98 g	0.98 g	0.98 g	0.98 g
Triazole Dispersion			none	none	none	none	none	none	none	none
Toner/Developer			TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g
Other				soln#1	soln#2	0.2g diacetin		0.58g soln#3	0.58g soln#3	0.58g soln#3
mix ~25sec then coat										
Ag Coating Gap (mil)			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
TC coating Gap (mil)							4.2	4.2	4.2	4.2
TC formula										
gel							10 g gel 30 soln	10 g gel 30 soln	10 g gel 30 soln	10 g gel 30 soln
toner/developer solution							2.6g TD#1	2.6g TD#1	2.6g TD#1	2.6g TD#1
thermal solvent							none	none	0.58 g soln#3	0.87 g soln#3
Coating quality right off of the coater bar										
Coating quality of sensi strips										
Processing	Blue base Dmin0.17		150C	150C	150C	150C	150C	150C	150C	150C
	soln#1 = 0.2g citric acid, 0.2g water									
	soln#2 = 0.2g 1,2,4-triazole, 0.2g water									
	soln#3 (20.6% solids) = 1.08g 1,3 diethyluree, 4.16 g water									
	gel 30 solution (7x) = 11.2 g gel 30, 58.8g water (melt at 40oC)									
	Toner/Developer solution #1 (15x) = BHTT/0.24g, BVSM/0.45g, SU/0.6g , DMU/0.6g , AAPZ/0.3g, AA/8.7g , H_2O/34.5g (hold at 35oC)									
	Drying T=124F/21 rev (19sec/rev)									
	Init AgBZT big batch pH = 7.96, adjusted to 5.50									
	Removed a couple of wraps from roll of base before using									
	For adding things to silver soln:									
	1. Weigh out AgBZT									
	2. Weigh out AgX									
	3. Weight out additive (benzyl alcohol or sucrose soln)									
	5. Add toner/developer									
	6. Stir 25 sec									

P 15226

Signature Karen Eckert

The foregoing disclosed to me on

Witness L. Buslee

Exhibit A

RESEARCH / DEVELOPMENT

Notebook No. BB9772

EASTMAN KODAK COMPANY

Date

Problem: Thermal Solvents in Ag + Ag/TC coatings

Print Stability Results

	8	9	10	11
	control w gel TC, 1,3-DEU in Ag	Control w gel TC, 1,3-DEU in TC and Ag	Control	Control w 1,3-dimethylurea
(10.5g gel/19.5 g H2O)				
@50C				
g MBTL 5.7 g water)				
@50C				
@40C				
	11.18 g/A	11.18 g/A	11.18 g/A	11.18 g/A
gel (melt@40C)	0.98 g	0.98 g	0.98 g	0.98 g
dispersion	none	none	none	none
coater	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g	TD1/2.8 g
	0.58g soln#3	0.58g soln#3		0.58g soln#3
phase coat				
Gap (mil)	3.0	3.0	3.0	3.0
Gap (mil)	4.2	4.2		
	10 g gel 30 soln	10 g gel 30 soln		
ver solution	none	none		
nt	none	0.58 g soln#3		
ly right off of the coater	w/o TD in soln too thick to coat over Ag, ribbed	w/o TD in soln too thick to coat over Ag, ribbed		
y of same strips				
	150C	150C	150C	150C

Trial	Description	1 = D0-Da Room	2 = D2-Dn Dim	3 = Dx-Dn Max	1 = D0-Da Room	2 = D2-Da Dim	3 = Dx-Dn Max	4 = 1 hr.	5 = 24 hr.	6 = 72 hr.	4 = 3 hr.	5 = 24 hr.	6 = 72 hr
		Print Stability						Print Stability (blue filter)			Print Stability (vis filter)		
		24 Hour Desk Top - vis			24 Hour Desk Top-blue			Picker - 1° Down			Picker - 1° Down		
		Δ Density 1	Δ Density 2	Δ Density 3	Δ Density 1	Δ Density 2	Δ Density 3	Δ Density 4	Δ Density 5	Δ Density 6	Δ Density 4	Δ Density 5	Δ Density
0	Control			0.520			1.010	0.210	0.690		0.170	0.450	
1	control w citric acid			0.47			0.780	0.230	0.780		0.140	0.440	
2	control w 1,2,4-triazole (positive acting system resulted)												
3	control w diacetin			0.67			0.890	0.220	0.790		0.140	0.580	
4	control w gel TC, T/D in TC			0.48			0.870	0.140	0.460		0.100	0.300	
5	Control w gel TC, T/D in TC, 1,3-DEU in Ag			0.68			1.000	0.240	0.830		0.180	0.640	
6	control w gel TC, T/D in TC, 1,3-DEU in Ag and TC			0.62			0.790	0.210	0.730		0.160	0.550	
7	Control w gel TC, T/D in TC, 1,3-DEU in Ag, 1.5x 1,3-DEU in TC			0.59			0.870	0.210	0.750		0.160	0.580	
8	control w gel TC, 1,3-DEU in Ag												
9	Control w gel TC, 1,3-DEU in TC and Ag												
10	Control			0.53			1.000	0.240	0.770		0.150	0.500	
11	Control w 1,3-dimethylurea			0.61			0.890	0.300	0.900		0.190	0.670	

Haze	
Trial	Proc.
0	36.7
1	36.3
2	96.4
3	47.8
4	53.8
5	53.6
6	52.7
7	52.5
8	
9	
10	38.4
11	38.6

Sensitometry Results Below:

Description	Initial LTLS Sensi; 15°, 150oC BSU, 10^-2 exposure												1 week NA LTLS Sensi: 15°, 150oC BSU, 10^-2 exposure										
	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	spd2/dmin	mod dmin	mod spd2	mod dmin/mod spd2	Ag Ct. Wt.	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	Ag Ct. Wt.	delta dmin	delta dmax	delta spd2	delta spd1
Control	0.296	2.228	4.481	****	0.423	0.589	5.348	15.14	0.32	4.51	14.20	2.42	0.371	2.106	4.149	****	0.322	0.541	5.234	2.45	0.075	-0.122	-0.332	-0.114
control w citric acid	0.290	2.208	4.231	****	0.323	0.517	5.059	14.59	0.32	4.28	13.33	2.35	0.320	2.185	4.359	****	0.470	0.527	5.325	2.24	0.030	-0.023	0.128	0.266
control w 1,2,4-triazole (positive acting system resulted)	0.863	1.476	****	****	****	****	6.725	****	0.86	****	****	2.62	v. fogged											
control w diacetin	0.445	2.618	5.641	****	0.229	0.926	6.013	12.68	0.43	5.62	13.12	2.70	v. fogged											
control w gel TC, T/D in TC	0.285	2.233	4.282	****	0.391	0.580	5.259	15.02	0.29	4.28	15.02	2.60	0.384	2.167	4.103	****	0.424	0.588	5.351	2.51	0.099	-0.066	-0.179	0.092
Control w gel TC, T/D in TC, 1,3-DEU in Ag	0.425	2.777	5.409	0.879	0.391	0.862	5.900	12.73	0.44	5.42	12.46	2.54	0.947	2.711	4.877	****	0.387	0.736	5.968	2.57	0.522	-0.066	-0.532	0.068
control w gel TC, T/D in TC, 1,3-DEU in Ag and TC	0.395	2.768	5.326	0.952	0.424	0.807	5.845	13.48	0.39	5.32	13.72	2.65	0.980	2.750	4.971	****	0.469	0.545	5.836	2.59	0.585	-0.018	-0.355	-0.009
Control w gel TC, T/D in TC, 1,3-DEU in Ag, 1.5x 1,3-DEU in TC	0.406	2.649	5.278	0.861	0.388	0.835	5.805	13.00	0.42	5.30	12.51	2.49	0.834	2.684	5.014	****	0.453	0.688	5.728	2.41	0.428	0.035	-0.264	-0.077
control w gel TC, 1,3-DEU in Ag	streaky												streaky											
Control w gel TC, 1,3-DEU in TC and Ag	streaky												streaky											
Control	0.303	2.505	4.663	0.866	0.385	0.703	5.469	15.39	0.29	4.65	15.92	2.70	0.457	2.464	4.408	****	0.388	0.465	5.391	2.58	0.154	-0.041	-0.255	-0.078
Control w 1,3-dimethylurea	0.315	2.457	4.988	0.800	0.283	0.920	5.601	15.83	0.32	4.99	15.78	2.59	0.744	2.492	4.869	****	0.380	0.674	5.723	2.60	0.429	0.035	-0.119	0.122

Description	Initial LTLS Sensi; 20°, 150oC BSU, 10^-2 exposure												Initial LTLS Sensi: 20°, 150oC BSU, 10^-2 exposure, paper used Ag side away from drum										
	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	spd2/dmin	mod dmin	mod spd2	mod dmin/mod spd2	Ag Ct. Wt.	Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	Ag Ct. Wt.	delta dmin	delta dmax	delta spd2	delta spd1
Control	0.309	2.482	4.771	****	0.280	0.737	5.533	15.44	0.34	4.82	14.05	2.34	0.268	0.698	****	****	0.246	0.235	3.759	2.52	-0.041	-1.784	#VALUE!	-1.774
control w citric acid	0.304	2.444	4.813	0.922	0.345	0.838	5.494	15.83	0.35	4.89	13.97	2.26	0.283	1.064	****	****	0.280	0.405	4.238	2.33	-0.021	-1.380	#VALUE!	-1.256
control w 1,2,4-triazole (positive acting system resulted)																				2.05	0.000	0.000	0.000	0.000
control w diacetin	0.836	2.780	5.447	****	0.506	0.737	5.913	6.52	0.91	5.49	6.06	2.40	0.303	2.057	4.742	****	0.278	0.914	5.664	2.45	-0.533	-0.723	-0.705	-0.249
control w gel TC, T/D in TC	0.320	2.885	4.972	1.332	0.461	0.755	5.568	15.54	0.32	4.97	15.48	2.59	0.279	0.667	****	****	0.227	0.256	3.626	2.90	-0.042	-2.218	#VALUE!	-1.943
Control w gel TC, T/D in TC, 1,3-DEU in Ag	0.567	2.886	5.556	1.176	****	0.981	6.006	9.80	0.59	5.58	9.43	2.49	0.345	1.396	****	****	0.248	0.796	5.576	2.65	-0.222	-1.490	#VALUE!	-0.430
Control w gel TC, T/D in TC, 1,3-DEU in Ag and TC	0.579	2.894	5.585	1.237	0.216	1.053	6.026	9.65	0.59	5.60	9.45	2.54	0.298	1.992	4.173	****	0.343	0.542	5.240	2.65	-0.281	-0.902	-1.412	-0.786
Control w gel TC, T/D in TC, 1,3-DEU in Ag, 1.5x 1,3-DEU in TC	0.658	2.791	5.493	****	0.224	1.019	5.967	8.35	0.73	5.55	7.63	2.35	0.346	1.734	3.661	****	0.441	0.499	5.150	2.50	-0.312	-1.057	-1.832	-0.817
control w gel TC, 1,3-DEU in Ag	streaky																				########	0.000	0.000	0.000
Control w gel TC, 1,3-DEU in TC and Ag	streaky																				########	0.000	0.000	0.000
Control	0.371	2.841	5.286	1.228	0.347	0.847	5.768	14.25	0.36	5.26	14.79	2.71	0.281	0.728	****	***	0.242	0.337	3.746	2.84	-0.090	-2.113	#VALUE!	-2.022
Control w 1,3-dimethylurea	0.351	2.594	5.246	0.884	0.335	0.934	5.705	14.95	0.39	5.30	13.70	2.36	0.285	1.662	3.687	****	0.319	0.373	4.860	2.42	-0.066	-0.932	-1.559	-0.845

5226

Signature Karen Eckert

The foregoing disclosed to me on ____ Witness L. Brasseur

94
otebook No. _____

RESEARCH / DEVELOPMENT

EASTMAN KODAK COMPANY

ate _____

oblem: Thermal Solvent in Ag + in Ag/TC coatings

Sensitometry Results (cont.)

Trial	Description	Initial LTLS Sensi: 25°, 150oC BSU, 10^-2 exposure												
		Dmin	Dmax	Spd2	AC-1	TC-1	TC-2	Spd1	spd2/dmin	mod dmin	mod spd2	mod dmin/mod spd2	Ag Ct. Wt.
0	Control	0.449	2.710	5.170	1.180	0.383	0.929	5.749	11.51	0.49	5.21	10.72	2.40
1	control w citric acid	0.331	2.548	5.283	1.240	0.333	0.884	5.696	15.96	0.36	5.33	14.69	2.37
2	control w 1,2,4-triazole (positive acting system resulted)												
3	control w diacetin												
4	control w gel TC, T/D in TC	0.397	3.047	5.457	1.503	0.356	0.749	5.950	13.75	0.40	5.46	13.60	2.57
5	Control w gel TC, T/D in TC, 1,3-DEU in Ag	0.802	2.939	6.278	0.554	****	1.185	6.351	7.83	0.80	6.28	7.86	2.61
6	control w gel TC, T/D in TC, 1,3-DEU in Ag and TC	0.830	2.920	5.882	0.676	***	0.806	6.126	7.09	0.82	5.88	7.14	2.62
7	Control w gel TC, T/D in TC, 1,3-DEU in Ag, 1.5x 1,3-DEU in TC	0.951	2.725	6.179	****	****	1.243	6.262	6.50	0.97	6.19	6.38	2.55
8	control w gel TC, 1,3-DEU in Ag	streaky											
9	Control w gel TC, 1,3-DEU in TC and Ag	streaky											
10	Control	0.444	2.988	5.473	1.447	0.141	1.062	5.878	12.33	0.42	5.44	13.09	2.78
11	Control w 1,3-dimethylurea	0.398	2.745	5.450	1.105	0.284	0.856	5.818	13.69	0.42	5.49	12.94	2.44

Conclusions + Comments:

Conclusion and Notes:

1) The initial AgBZT big batch pH was 7.96 and this was adjusted to 5.50 with H_2SO_4.
2) Three new thermal solvents were screened in the Ag layer: citric acid, 1,2,4-triazole, and diacetin. The 1,2,4-triazole resulted in some sort of positive acting system. Adding the diacetin resulted in an increase in dmin, spd, and dmax. At 20 sec processing the dmin was very high for this coating, around 0.8, this is not surprising because diacetin is a liquid at room temp. Adding diacetin did improve the sensitometry seen when processing away from the drum. Adding citric acid did not increase reactivity much, in fact at 25sec processing this coating had lower dmin than the control and slightly better spd. Adding citric acid did help sensitometry seen when processed away from the drum a little but not to the extent of some of the other thermal solvents, this is not surprising because the citric acid has a melting point above our processing temperature.
3) The other thing looked at in this experiment was coating a control with a gel topcoat with 1,3-DEU in either the silver or in both the topcoat and the silver. I attempted to test this with and without toner/developer added to the topcoat, unfortunately all of the coatings where the toner/developer was left out of the gel topcoat ended up coating very streaky. Usually any coating with a topcoat on it loses more sensitometry when processed backwards than the control. This happened again. Adding 1,3-DEU to the silver layer improved this some. Adding 1,3-DEU to both the silver and the topcoat layers further improved the sensitometry seen when processing away from the drum. Adding 1,3-DEU to the silver and a higher level of 1,3-DEU to the topcoat hurt the sensitometry a little bit so that it wasn't quit as good as adding 1,3-DEU to the silver and the topcoat at the lower level. For initial sensitometry all of the coatings with 1,3-DEU had a dmin around 0.5-0.6 at 20 sec processing and a spd2 around 5.5, (control w gel topcoat was dmin = 0.32, spd2=5.0. This is excepting the coating with 1,3-DEU in the Ag and 1,3-DEU at a higher level in the topcoat; this coating had higher dmin than the others.
4) For 1 week NA all of the coatings with 1,3-DEU had much worse dmin gain than the control. The coating with diacetin added was totally fogged and the coating with citric acid in it actually had better dmin aging than the control.
5) For desktop stability there wasn't a whole lot of difference between coatings. For viewbox stability all of them were about the same except for the control w gel topcoat coating which was about 0.2 delta dmin better than the control.

15226-

Signature Susan Eckert

The foregoing disclosed to me on _____ Witness L. Burleve